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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,803	02/16/2005	Takaaki Kishigami	MAT-8669US	1028

23122 7590 12/11/2008

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EXAMINER	
TRAN, THINH D	
ART UNIT	**PAPER NUMBER**
2419	
MAIL DATE	**DELIVERY MODE**
12/11/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/524,803	KISHIGAMI ET AL.	
	Examiner	Art Unit	
	THINH D. TRAN	2419	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-35 and 39-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-35 and 39-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 29-35, 39-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 29 line 7 cites “a transmission data sequence”, it is unclear if this is a new transmission data sequence or referring to "a transmission data sequence" in claim 29 line 4.

Claim 29 lines 15-18 cite “a deciding section for allocation the space-division-multiple-access compatible mobile station and the space-division-multiplex compatible mobile station by use of a predetermined space division multiplex transmission evaluation criterion and space-division-multiple-access evaluation criterion.” It is unclear how the deciding section allocates whether it is creating new resource for the SDMA mobile station and SDM mobile station or determining whether the mobile station is SDMA compatible or SDM compatible. There is a similar problem with claim 31 and 32.

Claim 40 depends on claim 37, which cancelled. For further prosecution of the application the Examiner interprets it as depend on claim 30.

Claim 41 depends on claim 38, which cancelled. For further prosecution of the application the Examiner interprets it as depend on claim 33.

2. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: there is no indication that the space division multiplex transmission is transmitted.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 29-35, 39-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over ONGGOSANUSI et al. (US 7,110,378) in view of WALTON et al. (US 20030128658).

Regarding claim 29, as it is understood in view of the above 112 problem, ONGGOSANUSI teaches a base station apparatus comprising: a partial-space orthogonalizing means for making a weighting process **(see col. 5 lines 24-30, wherein the beamformer weight (see fig. 1 block 30) determiner a set of beamformer weight then pass to transmitter module, wherein the transmitter module would comprise "partial-space orthogonalizing", (fig. 2 block 38, block))**, for enhancing orthogonality over a propagation path for a space division multiplex transmission **(see col. 5 lines 40-44, wherein the weight is applied to a unique sub-channel, which would read in the claim as "a propagation path," col. 10 line 4-7, wherein the weights are deprive from an orthogonal eigenvenvector and applied to the signal to transmit or receive signal via the orthogonal sub channel, which would read in the claim as enhancing orthorgonality, wherein with beamforming technology, it enables to reuse frequency and time slot for transmission)**, on a transmission data sequence to be sent by the space division multiplex transmission to the space-division-multiplex compatible mobile station allocated for the space division multiplex transmission within a communication area **(see col. 6 lines 15-29, wherein a stream of data is transmitted to a receiver, the transmitter module would consider as the "space division multiplex", while the receiver would read in the claim as the "compatible mobile station", and the weight are used to direct the beam toward a**

communication area, see col. 5 lines 24-30; a beam forming section for forming a transmission beam to a space-division-multiple-access compatible mobile station **(see col. 5 lines 24-30, wherein the beamformer weight (see fig. 1 block 30) determiner a set of beamformer weight then pass to transmitter module, see col.6 lines 2-5, wherein the signal is being weighted by the beamformer weight vector, to form a directional transmission)** responsive to a transmission data sequence within the communication area **(see col. 5 19-30, wherein the sub-channels selected base upon the channel state and the channel state can be obtained through transmission of training symbol sequences (transmission data sequence), and the weight can obtained from the channel state information (CSI), that are feed back to the transmitter (see col. 15 lines 54-57, col. 16 lines 14-19), wherein receiver (mobile station) can belong to the number of multi-access can be accommodated without interference (see col. 21 lines 16-17), wherein the beamformer direct the transmission that generate a communication area)** and an output of the partial-space orthogonizing means **(see col. 5 lines 65-67 and col. 6 lines 1-5, wherein in response to the signal modulator 18 and connected to the weight coupling, which would consider as the "partial-space orthogonizing")**, the transmission beam to the space-division-multiple- access compatible mobile station being to reduce an interference with another space-division-multiple-access compatible mobile station to access simultaneously **(see col. 21 lines 16-20, col. 21 32-43, wherein it shows the N-user access without multi-access interference)**; and a

plurality of antennas for transmitting the transmission beam **(see col. 4 lines 61-63, fig. 1 block 14)**,

However, ONGGOSANUSI fails to teach a deciding section for allocating the space-division-multiple-access compatible mobile station and the space-division-multiplex compatible mobile station by use of a predetermined space division multiplex transmission evaluation criterion and space- division-multiple-access evaluation criterion;

But, WALTON in the same field of endeavor teaches a deciding section for allocating the space-division-multiple-access compatible mobile station and the space-division-multiplex compatible mobile station by use of a predetermined space division multiplex transmission evaluation criterion **(see par. 63, wherein the selecting the best set would comprise the criterion to determine the best set, which comprise SDM compatible or SDM un-compatible)** and space- division-multiple-access evaluation criterion **(see par. 63 and par. 64, wherein the SNR would consider as the space-division-multiple-access criterion, which uses to determine the multiple access of the terminals to the base station)**.

The motivation would have been to provide an optimum transmission to a set of terminal.

Regarding claim 30, ONGGOSANUSI teaches a base station apparatus according to claim 29, wherein forming the transmission beam for reducing the

interference by the beam forming section is to form the transmission beam from the transmission data sequence to the allocated space-division-multiple-access mobile station **(see col. 9 lines 16-19, wherein the matrix H is represented as the overall channel characteristic for the available signal paths of the transmitted signal, in col. 21 lines 59-60 shows that the beamformer optimize the k-th user BER, wherein the BER depend on the interference, which the lower error rate the lower the interference)** and the output of the partial-space orthogonizing means, in a manner being orthogonal to a channel estimation matrix on another mobile station to access simultaneously **(see col. 9 lines 16-19, wherein the matrix H is represented as the overall channel characteristic for the available signal paths. see col. 10 lines 1-7, wherein the output after beamformer vector derives from the eigenvectors would be orthogonal to the matrix H)**.

Regarding claim 31, WALTON teaches a base station apparatus according to claim 29, wherein, in a case that the space-division-multiplex compatible mobile station and a space-division-multiplex uncompatible mobile station are allocated for the space division multiple access at a same time **(see WALTON par. 63 and par. 64, wherein the set comprise of SDM compatible and SDM uncompatible that can simultaneous access)**, the beam forming section makes, for the space-division-multiplex uncompatible mobile station, a maximum ratio synthetic beam as a transmission beam to the space-division-multiplex uncompatible mobile station and, for the space-division-multiplex compatible mobile station **(see WALTON par. 100-104,**

wherein the max-max criterion is used to assign transmit antennas to the terminals in the hypothesis being evaluated, which achieve best SNR for the transmit antenna, which the transmission beam would be synthetic), another transmission beam as a beam for reducing an interference with another of the space-division-multiplex uncompatible mobile station and space-division-multiplex compatible mobile station to access simultaneously **(see WALTON par. 100-104, wherein transmit antennas are assigned to a particular frequency subchannel group using the max-max and transmitting channel assigns to terminal for transmit antenna/terminal pairing, which the best SNR is achieved that would indicate the interference from other terminal would reduce)**.

Regarding claim 32, WALTON teaches a base station apparatus according to claim 30, wherein, in a case that the space-division-multiplex compatible mobile station and a space-division-multiplex uncompatible mobile station are allocated for the space division multiple access at a same time **(see WALTON par. 63 and par. 64, wherein the set comprise of SDM compatible and SDM uncompatible that can simultaneous access)**, the beam forming section makes, for the space-division-multiplex uncompatible mobile station, a maximum ratio synthetic beam as a transmission beam to the space-division-multiplex uncompatible mobile station and, for the space-division-multiplex compatible mobile station **(see WALTON par. 100-104, wherein the max-max criterion is used to assign transmit antennas to the terminals in the hypothesis being evaluated, which achieve best SNR for the**

transmit antenna, which the transmission beam would be synthetic), another transmission beam as a beam for reducing an interference with another of the space-division-multiplex uncompatible mobile station and space-division-multiplex compatible mobile station to access simultaneously **(see WALTON par. 100-104, wherein transmit antennas are assigned to a particular frequency subchannel group using the max-max and transmitting channel assigns to terminal for transmit antenna/terminal pairing, which the best SNR is achieved that would indicate the interference from other terminal would reduce)**.

Regarding claim 33, ONGGOSANUSI teaches a base station apparatus according to claim 29, wherein, forming the transmission beam for reducing the interference by the beam forming section is to form the transmission beam orthogonal to a channel estimation matrix on another of a space-division-multiplex uncompatible mobile station and space-division-multiplex compatible mobile station to access simultaneously **(see col. 9 lines 16-19, wherein the matrix H is represented as the overall channel characteristic for the available signal paths of the transmitted signal, in col. 21 lines 59-60 shows that the beamformer optimize the k-th user BER, wherein the BER depend on the interference, which the lower error rate the lower the interference)**.

Regarding claim 34, ONGGOSANUSI teaches a base station apparatus according to claim 29, further comprising space-time coding means for making a space-

time coding process on the transmission data sequence to the space-division-multiplex compatible mobile station **(see col. 6 lines 1-8, wherein the modulated signal stream are transmitted over multiple antennas (space time coded) and weighted with corresponding value (partial-space orthogonizing))**, the transmission data sequence space-time -coded being outputted to the partial-space orthogonizing means **(see col. 5 lines 30-35, wherein the stream of data transmits to the single stream transmitter module 18, wherein the transmitter module would comprise partial-space orthogonizing)**.

Regarding claim 35, ONGGOSANUSI teaches a base station apparatus according to claim 30, further comprising space-timecoding means for making a space-time coding process on the transmission data sequence to the space-division-multiplex compatible mobile station **(see col. 6 lines 1-8, wherein the modulated signal stream are transmitted over multiple antennas (space time coded) and weighted with corresponding value (partial-space orthogonizing))**, the transmission data sequence space-time -coded being outputted to the partial-space orthogonizing means **(see col. 5 lines 30-35, wherein the stream of data transmits to the single stream transmitter module 18, wherein the transmitter module would comprise partial-space orthogonizing)**.

Regarding claim 39, WALTON teaches a base station apparatus according to claim 29, wherein the space division multiplex transmission evaluation criterion and the

space-division-multiple-access evaluation criterion are to be calculated depending upon a channel estimation value and received quality received from the space-division-multiplex compatible mobile station and the space-division-multiple-access mobile station within the communication area **(see WALTON par. 65 and par. 70, wherein the criterion to determine the set of terminals, which comprise compatible and uncompatible terminals, and for simultaneous access are obtained from using channel state information and SNR)**.

Regarding claim 40, WALTON teaches a base station apparatus according to claim 37, wherein the space division multiplex transmission evaluation criterion and the space- division-multiple-access evaluation criterion are to be calculated depending upon a channel estimation value and received quality received from the space-division-multiplex compatible mobile station and the space-division-multiple-access mobile station within the communication area **(see WALTON par. 65 and par. 70, wherein the criterion to determine the set of terminals, which comprise compatible and uncompatible terminals, and for simultaneous access are obtained from using channel state information and SNR)**.

Regarding claim 41, WALTON teaches a base station apparatus according to claim 38, wherein the space division multiplex transmission evaluation criterion and the space- division-multiple-access evaluation criterion are to be calculated depending upon a channel estimation value and received quality received from the space-division-

multiplex compatible mobile station and the space-division-multiple-access mobile station within the communication area **(see WALTON par. 65 and par. 70, wherein the criterion to determine the set of terminals, which comprise compatible and uncompatible terminals, and for simultaneous access are obtained from using channel state information and SNR)**.

Regarding claim 42, WALTON teaches a base station apparatus according to claim 29, wherein, in a case that the space-division-multiple-access mobile stations include a space-division-multiplex compatible mobile station and a space-division-multiplex uncompatible mobile station **(see par. 63 par. 64)**,

ONGGOSANUSI teaches and the transmission beam to the space- division-multiplex compatible mobile station is formed in a manner being orthogonal to a channel estimation matrix on another space-division-multiple-access mobile stations to access simultaneously **(see col. 9 lines 16-19, wherein the matrix H is represented as the overall channel characteristic for the available signal paths of the transmitted signal, in col. 21 lines 59-60 shows that the beamformer optimize the k-th user BER, wherein the BER depend on the interference, which the lower error rate the lower the interference)**

However, ONGGOSANUSI and WALTON do not explicitly teach another transmission beam to the space-division-multiplex uncompatible mobile station is formed by use of a complex-conjugate-transposition of a channel estimation matrix on the space-division-multiplex uncompatible mobile station;

But, ONGGOSUNUSI teach calculating weight using the eigenvectors of complex-conjugate-transposition of a channel estimation matrix, which the weight uses for transmission beam **(see col. 5 lines 24-30, col. 14 lines 59-67, see col. 16 lines 14-20).**

Thus, it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement obtaining weight by using complex-conjugate-transposition of a channel estimation matrix for forming the transmission beam as taught by ONGGOSANUSI to transmit to SDM uncompatible as taught by WALTON for another transmission beam to the space-division-multiplex uncompatible mobile station is formed by use of a complex-conjugate-transposition of a channel estimation matrix on the space-division-multiplex uncompatible mobile station;

The motivation would have been to provide best possible set of terminals in simultaneous access for SDM compatible and SDM uncompatial.

Regarding claim 43, WALTON teaches a base station apparatus according to claim 30, wherein, in a case that the space-division-multiple-access mobile stations include a space-division-multiplex compatible mobile station and a space-division-multiplex uncompatible mobile station **(see par. 63 par. 64)**,

ONGGOSANUSI teaches and the transmission beam to the space- division-multiplex compatible mobile station is formed in a manner being orthogonal to a channel estimation matrix on another space-division-multiple-access mobile stations to access simultaneously **(see col. 9 lines 16-19, wherein the matrix H is represented as the**

overall channel characteristic for the available signal paths of the transmitted signal, in col. 21 lines 59-60 shows that the beamformer optimize the k-th user BER, wherein the BER depend on the interference, which the lower error rate the lower the interference)

However, ONGGOSANUSI and WALTON do not explicitly teach another transmission beam to the space-division-multiplex uncompatible mobile station is formed by use of a complex-conjugate-transposition of a channel estimation matrix on the space-division-multiplex uncompatible mobile station;

But, ONGGOSUNUSI teach calculating weight using the eigenvectors of complex-conjugate-transposition of a channel estimation matrix, which the weight uses for transmission beam **(see col. 5 lines 24-30, col. 14 lines 59-67, see col. 16 lines 14-20).**

Thus, it would have been obvious to the person of ordinary skill in the art at the time of the invention to implement obtaining weight by using complex-conjugate-transposition of a channel estimation matrix for forming the transmission beam as taught by ONGGOSANUSI to transmit to SDM uncompatible as taught by WALTON for another transmission beam to the space-division-multiplex uncompatible mobile station is formed by use of a complex-conjugate-transposition of a channel estimation matrix on the space-division-multiplex uncompatible mobile station;

The motivation would have been to provide best possible set of terminals in simultaneous access for SDM compatible and SDM uncompatial.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THINH D. TRAN whose telephone number is (571)270-3934. The examiner can normally be reached on Monday to Friday from 7:30 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel J. Ryman can be reached on (571)272-3152. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/T. D. T./
Examiner, Art Unit 2419
12/06/2008

/Daniel J. Ryman/
Supervisory Patent Examiner, Art Unit 2419